

Effect of Medication Use on Falls: Balancing Risk, Benefit, and Prevention Strategy

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Objectives

- Understand what characteristics of medications make them potentially cause falls
- List prescription and over-the-counter medications that may contribute to falls in older adults
- Discuss importance of Vitamin D in fall prevention
- Know the proper dose of Vitamin D that all older adults should be taking

Fun Facts about Meds and Falling

- Increasing the number of medications used by an older adult increases the risk of falling
- Community-dwelling older adults
 - Use of ≥ 4 meds increases risk of falling by 30%
- Nursing home-dwelling older adults
 - Use of 5-9 meds increases risk of falling 4-fold
 - Use of ≥ 10 meds increases risk of falling more than 5-fold

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Problems When Considering Medications and Fall Risk

- Most medical literature on the topic is observational data
- Falls are not regularly recognized as an adverse effect of a medication and thus not reported in clinical trials
 - Many times falling is noticed after the fact and not looked for up front
 - Reasons for falls are multi-factorial
 - Falls as an adverse effect is not well defined

Classes of Medications Generally Thought to Increase Fall Risk

- Anti-anxiety
- Sleep Aids
- Antidepressants
- Antipsychotics
- Cardiovascular
- Pain medication
- Antihistamines (especially over-the-counter)

Anti-anxiety Medication

- Benzodiazepines
 - Examples: Klonopin, Xanax, Ativan, Valium
- Why might these meds cause a fall?
 - May cause dizziness, drowsiness and confusion
- What's the risk?
 - Increased risk when starting the med, when used long-term and regardless of medication half-life
 - Use of 2 or more benzodiazepines at the same time increases risk of hip-fracture 2-fold

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Sleep Aids

- Benzodiazepines, Ambien, Sonata, Lunesta
- Why might these meds cause a fall?
 - May cause dizziness, drowsiness, and confusion
- What's the risk?
 - Some thoughts that newer meds (Ambien, Sonata, Lunesta) would be safer
 - One study showed Ambien to be just as risky as benzodiazepines

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Antidepressants

- Several classes
 - SSRIs (ex: Prozac, Zoloft, Celexa)
 - TCAs (ex: amitriptyline, imipramine)
 - Trazodone
- Why might these meds cause a fall?
 - Work on the central nervous system, may cause dizziness, palpitations, visual disturbances
 - Anticholinergic effects: may cause mental status changes and orthostatic hypotension

Antidepressants

- What's the risk?
 - Increases risk of falls by 1.2 to 6-fold
 - Risk of hip fracture increases within first 2 weeks of starting therapy
 - SSRIs (Prozac and Paxil) and TCAs
 - Remains elevated during long-term use and is dose dependant

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Antipsychotics

- Risperdal, Zyprexa, Haldol, Geodon, Abilify, Seroquel
 - Older meds like Haldol are probably worse
 - Not much literature out there for the newer meds in this class
- Why might these meds cause a fall?
 - Work in the central nervous system, can cause drowsiness, dizziness, orthostatic hypotension, tremor

Antipsychotics

- What's the risk?
 - Medical literature shows that the class as a whole increases risk of falls
 - Some individual meds have not shown increased risk
 - Zyprexa, Risperdal
 - Some studies have shown a dose dependent effect
 - Risperdal 2mg/day increases falls while 1mg/day did not

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A Quick Comment...

- All of the classes just reviewed have something in common:
 - Action in the **CENTRAL NERVOUS SYSTEM**
 - Major characteristic of medications that may cause falls
- British study of 4050 women
 - Sleep aids, anti-anxiety and antidepressant medications were independently associated with falls
 - Adjustments were made for many confounders including age, alcohol use, several disease states and laboratory values
 - For each medication taken, risk of falls increased by 5%

BMJ 2003; 327:

Cardiovascular Medications

- Beta-blockers, nitrates, vasodilators, centrally acting agents, diuretics
 - Trials contain mixed and incomplete data
- Why might these meds cause a fall?
 - Orthostatic hypotension, some act on the central nervous system, may cause dizziness
- What is the risk?
 - Antihypertensives increase risk of injurious falls
 - Vasodilators increase risk of recurrent falls
 - Nitrates increase risk of all falls

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Pain Medications

- Opioids
 - Darvocet, Lortab/Vicodin, morphine, codeine
 - Mixed data for this class
- Why might these meds may cause a fall?
 - May cause dizziness, drowsiness, mental status changes, confusion, hypotension
- What is the risk?
 - One study found a 68% increased risk of falls
 - Another study found no increased risk

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Antihistamines

- Diphenhydramine (Benadryl), chlorpheniramine
- Why might these medications cause a fall?
 - Anticholinergic effects
 - Mental status changes, confusion, delirium
 - Orthostatic hypotension

Key point to remember:

Over-the-counter meds can be just as problematic as prescription meds!

What Can Be Done?

- Be aware of the increasing risk of falls associated with starting a new medication
 - Especially when starting an anti-anxiety, sleep aid or antidepressant med
- Anticipate side effects: plan for them
 - Monitor the patient more frequently
 - Educate the patient/caregiver about what to expect and when to call PCP
 - Gradual withdrawal of medication may reduce rate of falls but not risk of falling

Interesting Intervention

- Prescribing modification program for primary care physicians
 - Education provided to physicians to improve prescribing practices
 - Patients completed a self-assessment tool regarding fall risk and medications
 - Reduced risk of falling by ~40%

Cochrane Database of Systematic Reviews 2009. Issue 2. Art No: CD007146.

Ok, so are there any meds that prevent falls?

- YES!
 - Vitamin D
- Meta-analysis published in JAMA in 2004
 - Reviewed 5 trials including 1237 patients
 - Vitamin D supplementation reduced risk of falling by 20%
 - Number needed to treat to prevent 1 fall: 15
 - Reduced body sway by 9% within 2 months

JAMA 2004; 291: 1999-2006.

Recent Controversy

- Cochrane Review

- Reviewed 111 trials with 55,303 patients
- Overall, Vitamin D did not reduce falls
 - May reduce falls in patients who have a low Vit D level
 - Supplementation may not have been the correct dose

Cochrane Database of Systematic Reviews 2009. Issue
2. Art No: CD007146.

Vitamin D: Not Just Good for Bones

- Vitamin D deficiency
 - Increases body sway
 - Decreases muscle strength
 - Decreases muscle mass
- Bottom Line = increased fall risk when Vitamin D level is low

Where do we get Vitamin D?

- Diet
 - Dairy products (milk, yogurt,)
 - Fish (salmon, tuna, halibut)
 - Eggs
- Sunlight
 - Vitamin D is made in the skin in reaction to sun exposure (UVB rays)
 - Spending 5-15 minutes outside (10am-3pm) at least twice per week
 - Effect is negated if sunscreen is worn
 - Effect not as great in winter or at higher latitudes

How is Vitamin D deficiency diagnosed?

- Simple blood work
 - Vitamin D level (aka 25-hydroxyvitamin D)
- Normal range is greater than 30
- Toxicity is seen if level is greater than 150
- Observational data for Cheyenne area
 - Every patient I have checked in the past few months has had a level less than 10!

Vitamin D Supplementation

- Over-the-Counter

- Vitamin D2 and/or D3

- Doses 400 IU, 1000 IU, 2000 IU, 5000 IU, 10,000 IU, 50,000 IU

- D2 verses D3

- D2

- Plant derived, possible age related problems with metabolism

- D3

- More potent in humans, may be more effective at increasing vitamin D levels, found in fish

Am J Clin Nutr 2006; 84: 694-697.

Vitamin D Supplementation

- Prescription

- Drisdol (D2) 50,000 IU capsule

- Calcitriol

- Soft gel cap 0.25mcg, 0.5mcg
 - Injection 1mcg/mL

Treatment and Prevention of Vitamin D Deficiency

■ Treatment

- 50,000 IU of D2 every week for 8 weeks
- Redraw level, if less than 30, repeat course

■ Prevention

- 800-1000 IU D3 per day
- 50,000 IU D2 every 2 weeks or once monthly

N Eng J Med 2007; 357: 266-281.

National Osteoporosis Foundation Recommendations

- At least 1,200mg of calcium PLUS 800-1000 IU Vitamin D3 per day in adults > 50 years
- Regular weight bearing and muscle-strengthening exercises

Clinician's Guide to Prevention and Treatment of Osteoporosis 2008. National Osteoporosis Foundation.

Can you have too much of a good thing?

- Vitamin D is fat soluble
- Many studies have looked for toxicity with huge replacement doses, no evidence has been found
 - 10,000 IU per day may be safe to maintain optimal levels

Am J Clin Nutr 2007; 85: 6-18.

Vitamin D Bottom Line for Fall Prevention

- Purchase over-the-counter product
 - Vitamin D3 seems to be a better choice
 - Dose: 800 to 1000 IU daily
 - May take as a single dose or in divided doses
 - May take without regard to meals
- Have a vitamin D level drawn
 - Good screening tool
 - Repeat every 3-6 months to see progress

Summary

- Many medications contribute to fall risk
 - Anti-anxiety, sleep aids and antidepressants are most likely
 - Over-the-Counter meds can pose a problem too
- Vitamin D may prevent falls
 - Supplementation with 800-1000 IU of D3 every day is recommended for all adults over the age of 50

Questions

